REMARKS

This is in response to the Office Action of July 24, 2008. With this response the specification is amended, claims1, 2 and 4-10 are amended and all pending claims 1-10 are presented for reconsideration and favorable action.

In the Office Action, the specification was objected to. A number of typographical errors in the specification have been corrected and it is believed that the rejection under 35 U.S.C. § 112 may be withdrawn.

Claims 4-10 were rejected under 35 U.S.C. § 112. Those claims have been amended and it is believed that the rejection may be withdrawn.

In the Office Action claims 1 and 3 were rejected under 35 U.S.C. § 102 based upon Naoki Shimosaka et al. (US 5,327,276), claim 2 was rejected based upon Shimosaka in view of Oberg (US 5,963,348), claims 4, 6, 7 and 8 were rejected based upon Shimosaka in view of Danagher et al. (US 5,959,749), claim 5 was rejected based upon Shimosaka and Danagher in view of Oberg while claims 9 and 10 were rejected based upon Shimosaka and Danagher in view of Dennis et al. (US 5,539,560). In view of the above amendments and following remarks, it is believed that the pending claims are patentably distinct from these references.

Regarding Shimosaka, this reference discloses a ring-type network. That is, all of users should be connected in series in a ring (see lines 57-60, column 3). However, the present invention involves a star-type network. That is, the users should be around a network router that is located at the center. And each user is connected to an external interface of the router through a fiber so as to form a star configuration (see nodes 3-1, 3-2, 3-3, 3-4).

Since Shimosaka relates to ring-type network, it is necessary to specify a fixed wavelength λ as an address number thereof (see lines 23-26, column 4), which can replace the binary number that is allocated to each node as node address in conventional technique (see lines 8-15, column 4). In the conventional technique, once the signal passes through each node, optical/electronic conversion or electronic/optical conversion should be performed. This will degrade the transmission rate of signals.

In contrast, the present invention is applicable to a specific network which has a star-configuration. Each node is allocated not only a serial number but also a wavelength λ. As claimed in claim 1, the badge comprising a serial number and

a wavelength is used as a network address for each node in the network. For one receive node, the wavelengths adopted by transmit nodes are different from one another (see Figs. 5 and 6). For example, for a network having 4 nodes, if nodes 2 and 4 want to transmit signals to node 1, the wavelength adopted by node 2 may be λ_1 while the wavelength adopted by node 4 may be λ_3. This can achieve the advantages a follows. The optical signals can arrive at receive node directly, without need passing through a plurality of other nodes as disclosed in Shimosaka. Obviously, passing through a plurality of nodes before arriving at the receive node may cause serious attenuation. In contrast, in present invention, it is not necessary to form a ring-type network and the failure in one node does not cause the failure of whole network.

In addition, the present invention is directed to a quantum network. This means the carrier for information is quantum state. However, all of the cited references are related to the conventional optical communications, because the carrier of information is the strength of optical signal or the phase of the optical signal. None of them is applicable to the quantum communications.

Oberg discloses a line-type network having a bus-configuration. This means all of users should be connected with each other in series in a line. Any communication signal that is transmitted from a node that is not adjacent to the present node should pass through the present node. This obviously causes attenuation in transmission.

In contrast, in present invention, the photon signals for communication between two nodes do not pass through other nodes, because optical signals are coupled between these nodes directly, without cause any attenuation. As disclosed by Oberg, the number of the wavelengths is $N^2/4$ (where N is even) or $(N-1)^2/4$ (where N is odd) (see lines 9-15, column 3). When N is larger than 6, the number of wavelengths is larger than N. With the increasing of N, the number of wavelengths will increase in a squared order. However, in the star-type network of the present invention, the number of the wavelength is N-1 or N, which is in proportional to the number of the nodes. The more the number of the users in the network is, the more differences between the present invention and Oberg are. Accordingly, the amended claim 1 is not obvious in view of cited references.

The amended claim 4 claims a router in a quantum network. The router comprises N optical components each comprising a mix wavelength interface which

is an external interface of the router, and at least N-1 separate wavelength interfaces. Every separate wavelength interface transmits different photon signals having different wavelengths. Each of separate wavelength interfaces of different optical components, which transmit the same wavelength signals, are directly coupled to one another so as to route the photon signals with different wavelength transmitted by one node to other nodes by using an addressing badge. The addressing badge is made up of two parts. One part is determined by the wavelength of the photon signal which the node sends. The other part is determined by the address serial number of the node. As can be seen from the above, the amended claim 4 is specific and indefinite. For example, as shown in Fig. 1, the router described in the embodiment comprises 4 optical components, and each optical component comprises 3 (= 4 - 1) separate wavelength interfaces and one mix wavelength interface. The mix wavelength interface is used as an external interface for the router. For any two optical components, the separate wavelength interfaces having same wavelength are coupled to each other directly.

In contrast, Danagher discloses that an 8x8 optical switch is disposed among optical components, and a switch controller is configured to control the optical switch. In other words, the router of claim 4 does not need any optical switch and controller while achieving the objection of addressing in a quantum network. Therefore, claim 4 is not obvious in view of the cited references.

In view of the above amendments and remarks, it is believed that the present application is in condition for allowance. Reconsideration and favorable action are respectfully requested.

The Director is authorized to charge any fee deficiency required by this paper or credit any overpayment to Deposit Account No. 23-1123.

Respectfully submitted,

WESTMAN, CHAMPLIN & KELLY, P.A.

By: /Judson K. Champlin/

Judson K. Champlin, Reg. No. 34,797
900 Second Avenue South, Suite 1400
Minneapolis, Minnesota 55402-3319
Phone: (612) 334-3222 Fax: (612) 334-3312

JKC:lrs